

DOCKET NO. IB-1330D

Express Mailing Label No. EF333129215US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Shimon Weiss et al.

Appl. No. : Division of Serial No. 09/349,833

Filed : Herewith

Title : ORGANO LUMINESCENT SEMICONDUCTOR
NANOCRYSTAL PROBES FOR BIOLOGICAL
APPLICATIONS AND PROCESS FOR
MAKING AND USING SUCH PROBES

Grp./A. U. : 1641

Examiner : Christopher L. Chin

Docket No. : IB-1330D

Honorable Commissioner of Patents
Washington, D.C. 20231

May 24, 2001

PRELIMINARY AMENDMENT

Dear Sir:

This is a preliminary amendment for the Divisional application filed herewith.

IN THE SPECIFICATION:

Page 1, line 4 (after the title), please add the following:

"CROSS-REFERENCE TO RELATED APPLICATION"

"This application is a divisional application of U.S. Patent Application Serial No. 09/349,833 filed July 8, 1999, as a continuation of U.S. Patent 5,990,479 issued November 23, 1999."

Please replace the paragraph beginning at page 9, line 1, with the following rewritten paragraph:

--Formation of nanometer crystals of Group III-V semiconductors is described in copending and commonly assigned Alivisatos et al. U.S. Patent 5,751,018; Alivisatos et al. U.S. Patent 5,505,928; and Alivisatos et al. U.S. Patent 5,262,357, which also describes the formation of Group II-VI semiconductor nanocrystals, and which is also assigned to the assignee of this invention. Also described therein is the control of the size of the semiconductor nanocrystals during formation using crystal growth terminators. The teachings of Alivisatos et al. U.S. Patent 5,751,018 and Alivisatos et al. U.S. Patent 5,262,357 are each hereby specifically incorporated by reference.--

IN THE CLAIMS:

Please cancel claims 1-51.

Please add the following new claims 52-78, which constitute non-elected claims 74-100 of parent application Serial No. 09/349,833:

52. A luminescent semiconductor nanocrystal probe, comprising:
- a) a water-soluble semiconductor nanocrystal comprising:
 - i) a core comprising a first semiconductor material; and
 - ii) a core-overcoating shell comprising a second semiconductor material;
 - b) a linking agent comprising a first portion and a second portion, wherein said first portion is linked to said water-soluble semiconductor nanocrystal; and
 - c) an affinity molecule linked to said second portion of said linking agent.
53. The probe of claim 52, wherein said first semiconductor material is a II-VI semiconductor or a III-V semiconductor.
54. The probe of claim 53, wherein said first semiconductor material is a II-VI semiconductor.
55. The probe of claim 53, wherein said first semiconductor material is a III-V semiconductor.

56. The probe of claim 54, wherein said first semiconductor material is MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, or HgTe.

57. The probe of claim 55, wherein said first semiconductor material is GaAs, InGaAs, InP, or InAs.

58. The probe of claim 52, wherein said second semiconductor material is a II-VI semiconductor or a III-V semiconductor.

59. The probe of claim 58, wherein said second semiconductor material is a II-VI semiconductor.

60. The probe of claim 58, wherein said second semiconductor material is a III-V semiconductor.

61. The probe of claim 59, wherein said second semiconductor material is MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, or HgTe.

62. The probe of claim 60, wherein said second semiconductor material is GaAs, InGaAs, InP, or InAs.

63. The probe of claim 52, wherein said first semiconductor material is CdSe and said second semiconductor material is ZnS.

64. The probe of claim 52, wherein said linking agent comprises a thiol moiety.

65. The probe of claim 64, wherein said linking agent further comprises an alkyl group.

66. The probe of claim 65, wherein said alkyl group is a propyl group.

67. The probe of claim 52, wherein said linking agent is N-(3-aminopropyl)-3-mercapto-benzamide, 3-aminopropyl-trimethoxysilane, 3-mercaptopropyl-trimethoxysilane, 3-maleimidopropyl-trimethoxysilane, and 3-hydrazidopropyl-trimethoxysilane.

68. The probe of claim 52, wherein said nanocrystal compound further comprises a glass coating on said shell.

69. The probe of claim 68, wherein said glass coating comprises a polymeric oxide.

70. The probe of claim 69, wherein said polymeric oxide is an oxide of silicon, an oxide of boron, an oxide of phosphorus, or a mixture thereof.

71. The probe of claim 69, wherein said glass coating further comprises metal silicate, a metal borate or a metal phosphate.

72. The probe of claim 68, wherein said linking agent is selected from the group consisting of N-(3-aminopropyl)-3-mercapto-benzamide, 3-aminopropyl-trimethoxysilane, 3-mercaptopropyl-trimethoxysilane, 3-maleimidopropyl-trimethoxysilane, and 3-hydrazidopropyl-trimethoxysilane.

73. The probe of claim 52, wherein said affinity molecule is an antibody, a nucleic acid, a protein, a polysaccharide or a small molecule.

74. The probe of claim 52, wherein said affinity molecule is avidin, streptavidin, biotin or anti-digoxigenin.

75. The probe of claim 52, wherein said affinity molecule is streptavidin.
76. The probe of claim 52, wherein said linking agent is 3-mercaptopropyl-trimethoxysilane and said affinity molecule is avidin, streptavidin, biotin or anti-digoxigenin.
77. The probe of claim 52, wherein said linking agent is 3-mercaptopropyl-trimethoxysilane and said affinity molecule is streptavidin.
78. The probe of claim 52, wherein said shell epitaxially surrounds said core.

REMARKS

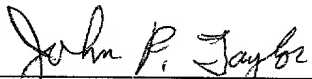
Claims 1-51 have been cancelled by this preliminary amendment to the divisional application being filed herewith. Claims 1-51 constitute the original claims filed in Serial No. 08/978,450 (now U.S. Patent 5,990,479). Parent application Serial No. 09/349,833 (the parent of this divisional application) was filed as a continuation of Serial No. 08/978,450. New claims 52-100 were added by amendment to parent application Serial No. 09/349,833. These new claims 52-100 were subject to restriction to Group I, claims 52-73; and Group II, claims 74-100. Group I, claims 52-73 were elected for prosecution in parent application Serial No. 09/349,833. The claims of the non-elected Group II (claims 74-100 in parent application Serial No. 09/349,833) are therefore presented for prosecution in this divisional application as new claims 52-78.

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If the Examiner in charge of this case feels that there are any remaining unresolved issues in this case, the Examiner is urged to call the undersigned attorney at the below listed telephone number which is in the Pacific Coast Time Zone.

Respectfully Submitted,


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VERSION WITH MARKINGS TO SHOW CHANGES MADE**In the Specification:**

The paragraph beginning at line 1 of page 9, as been amended as follows:

Formation of nanometer crystals of Group III-V semiconductors is described in copending and commonly assigned Alivisatos et al. U.S. Patent 5,751,018; Alivisatos et al. U.S. Patent 5,505,928; ~~Serial No. 08/235,265, filed April 29, 1994 as an FWC application of Serial No. 07/796,246, filed November 11, 1991;~~ and Alivisatos et al. U.S. Patent 5,262,357, which also describes the formation of Group II-VI semiconductor nanocrystals, and which is also assigned to the assignee of this invention. Also described therein is the control of the size of the semiconductor nanocrystals during formation using crystal growth terminators. The teachings of Alivisatos et al. U.S. Patent 5,751,018 ~~Serial No. 08/235,265~~, and Alivisatos et al. U.S. Patent 5,262,357 are each hereby specifically incorporated by reference.

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